

**SOUTH DEER LODGE ENTRYWAY IMPROVEMENT PROJECT  
ENVIRONMENTAL ASSESSMENT**

*prepared by*

*the Department of Environmental Quality*

*for*

*the Department of Corrections*

**August, 1997**

STATE DOCUMENTS COLLECTION

FEB 26 1999

MONTANA STATE LIBRARY  
1515 E. 6th AVE.  
HELENA, MONTANA 59620

PLEASE RETURN

MONTANA STATE LIBRARY



3 0864 0014 3452 4

# DEPARTMENT OF CORRECTIONS



MARC RACICOT, GOVERNOR

1539 11TH AVENUE

## STATE OF MONTANA

(406) 444-3930  
FAX (406) 444-4920

PO BOX 201301  
HELENA, MONTANA 59620-1301

August 8, 1997

TO ALL MEMBERS OF THE PUBLIC INTERESTED IN THE ARCO/POWELL COUNTY  
SOUTH DEER LODGE ENTRYWAY IMPROVEMENT PROJECT(SDLEIP)

Dear Interested Montanan:

Enclosed for your review is an environmental assessment (EA) prepared by the Department of Environmental Quality (DEQ) for the Department of Corrections (DOC). This EA evaluates a proposal by the City of Deer Lodge, Powell County and the Atlantic Richfield Company to improve and beautify approximately 100 acres south of Deer Lodge. Part of this land is owned by the DOC a portion of which is leased to the City of Deer Lodge through the Department of Natural Resources and Conservation (DNRC), and part of the land is privately owned. Collectively, the development of the four subareas contained in the project is called the South Deer Lodge Entryway Improvement Project.

A public meeting will be held by the DOC at the Deer Lodge Community Center on Wednesday, September 3, 1997 at 7:00 p.m. Concerned citizens are invited to provide written or oral comment regarding the EA at that time. Written comments on this EA will continue to be received by the DOC at the address below until 5 p.m. on September 10, 1997.

Comments should substantively assess the discussion of issues in the EA, provide new information that may influence the analysis, and provide clarification. The DOC will use these substantive comments, agency responses, the EA, and the project's draft design report to make a final decision whether to approve the proposed improvements to the state land leased to the City of Deer Lodge. The decision may be to approve the proposal as submitted, deny the proposal, approve an alternative, or postpone the decision until more information is available.


Written comments should be sent to:

Ron Paige, MSP Ranch Manager  
Montana Correctional Enterprises  
Department of Corrections  
350 Conley Lake Road  
Deer Lodge, MT 59722



To Interested Montanans  
August 11, 1997  
page two

Thank you for your time and consideration. Please call me (406-846-1320 ext. 2322) if you have any questions.

Sincerely,   
Ron Paige, MSP Ranch Manager  
Montana Correctional Enterprises



## ***Environmental Assessment***

**PROPOSED PROJECT:** South Deer Lodge Entryway Improvement Project

**SITUATED:** South of the City of Deer Lodge, MT (Section 4 and Section 9, Township 7 North, Range 9 West, Montana Principal Meridian)  
County: Powell

**PROPERTY OWNERSHIP:** [ ] Federal [X] State [X] Private

### **1.0 PURPOSE of the PROPOSED ACTION:**

The Department of Corrections (DOC) has been asked by the City of Deer Lodge to approve improvements to land owned by the department south of Deer Lodge. The land is leased to the city by the DOC's land manager, the Department of Natural Resources and Conservation (DNRC). In accordance with the Montana Environmental Policy Act (MEPA), the DOC decided it was appropriate to prepare an environmental assessment (EA), in conjunction with other state agencies, to assess any potential impacts to the physical or human environments, and allow the public an opportunity to review and comment on the assessment.

### **2.0 DESCRIPTION OF PROPOSAL:**

The South Deer Lodge Entryway Improvement Project (SDLEIP) is a improvement and beautification project for the entryway of Deer Lodge, coordinated by the city and Powell County in partnership with the Atlantic Richfield Company (ARCO). The project area is approximately 100 acres along a frontage road (referred to as Main Street) between Interstate 90 and the city.

The SDLEIP has been divided into four subareas. Subareas 1 and 4 and a portion of Subarea 3 are privately owned land. The city has a 30-year lease for the land in Subarea 1, with 10-year lease renewal options. Subarea 2 and the remaining portion of Subarea 3 are DOC land.





## 2.1 Location

The SDLEIP northern border is formed by the City of Deer Lodge, the west and south borders follow the Clark Fork River, and the east border is the former frontage highway (Valley View Drive) leading into the city (Enclosure 1).

## 2.2 Existing Conditions

The site is relatively flat with various wetlands, meadows and areas of heavy vegetation. The vegetation consists mostly of native grasses, willows, water birch and knapweed. Patches of tailings (both exposed and buried) are randomly distributed throughout the area. The tailings are mining, milling and smelting wastes that contain metals and metalloids, chiefly from copper mining and smelting in the Butte and Anaconda areas. They were deposited around the turn of the century (Enclosure 2).

Because of the deposits, the SDLEIP is within the Clark Fork River Operable Unit of the Milltown Reservoir Sediments Superfund Site, which extends approximately 140 river miles from Warm Springs Ponds to Milltown Dam, five miles east of Missoula, MT. The proposed project is a voluntary effort outside of the remedial investigation and feasibility study (RI/FS) activities that ARCO is obligated to perform under order by the U.S. Environmental Protection Agency (EPA). The proposed construction activities are also voluntary.

It is anticipated the Clark Fork FS will be completed in the fall of 1997. It will evaluate and compare remedial alternatives, protectiveness and costs. The EPA, in consultation with the Department of Environmental Quality (DEQ), will select a remedy for the Clark Fork River (Including the Deer Lodge area) on the basis of that document and prepare a remedial action plan for public review and comment. Remedy selection and a Record of Decision (ROD) is not anticipated until early 1998.

## 2.3 Subarea 1

Work in Subarea 1 was done under the auspices of the Demonstration Project Work Plan, which includes studies of the treatment and revegetation of tailings along the streambank and in the nearby floodplain. The lime amendment portion of the project was completed by ARCO with DEQ oversight. ARCO completed the remaining demonstration project activities in

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes the need for transparency and accountability in financial reporting.

2. The second part of the document outlines the various methods and techniques used to collect and analyze data. It includes a detailed description of the experimental procedures and the statistical tools employed to interpret the results.

3. The third part of the document presents the findings of the study. It provides a clear and concise summary of the key results, highlighting the significant differences and trends observed during the experiment.

4. The fourth part of the document discusses the implications of the findings and offers suggestions for future research. It also addresses the limitations of the study and provides a comprehensive conclusion to the report.

5. The final part of the document includes a list of references and a bibliography, providing a complete list of the sources used in the research. It also includes a list of figures and tables for easy reference.

the absence of DEQ oversight. Since the work in this subarea was done in accordance with treatability testing provisions (testing to see if treatment technologies work) of the federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) as part of the RI/FS (the functional equivalent of the National Environmental Policy Act), no MEPA review was required.

Subarea 1 is approximately 16 acres and designed for recreational use. It includes a fishing access, parking area, raft launch and walking trails.

Treatability testing activities included: topographic reconfiguration of tailings, treatment of tailings in-situ with lime, application of soil cover, and revegetation of amended tailings and soils. Other work included that was not related to the treatability test was: debris removal, wetland enhancement, and construction of a fishing access/parking area and raft launch. Streambank stabilization was also planned for the demonstration project but was subsequently postponed due to potential negative impacts on spawning gravels during the construction season. Plans also include post-construction maintenance, monitoring, and record keeping.

To date, ARCO has not provided any measurements demonstrating effectiveness of the treatability test. Post-construction monitoring and maintenance reporting for Subarea 1 has been limited.

#### **2.4 Subarea 2**

Since the CERCLA demonstration project designation was not extended to Subarea 2 or the remaining subareas, it and any other development will be reviewed under the provisions of MEPA.

Subarea 2 begins north of the highway bridge across the Clark Fork River. It is bounded on the east by Main Street and the west by the river. Moving north (or downstream) it narrows as it crosses a small stream, Peterson Creek), then widens again after crossing Conley Avenue. The northern part of the subarea is the land between the Clark Fork River and Old Montana State Prison (Enclosure 3).

An old oxbow channel exists in the southern third of the project. The channel does not flow, but soils in the channel are saturated and a pond has formed at one end of the channel. The areas surrounding Peterson Creek and the oxbow channel are thickly vegetated with willows, wetland grasses and some knapweed along the perimeter.

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that this is crucial for ensuring transparency and accountability in the organization's operations.

2. The second part of the document outlines the various methods and tools used to collect and analyze data. It highlights the need for consistent data collection procedures and the use of advanced analytical techniques to derive meaningful insights from the data.

3. The third part of the document focuses on the implementation of data-driven decision-making processes. It provides a detailed overview of the steps involved in identifying key performance indicators (KPIs) and using data to inform strategic decisions.

4. The fourth part of the document discusses the challenges and risks associated with data management and analysis. It addresses issues such as data quality, security, and privacy, and offers strategies to mitigate these risks.

5. The final part of the document provides a summary of the key findings and recommendations. It emphasizes the importance of ongoing monitoring and evaluation to ensure that the data-driven approach remains effective and relevant over time.

Deer Lodge has developed a Community Land Use Plan for the site. The plan provides for a recreational/park area including a trail system, fishing access, parking area and various park features along the Clark Fork River. The design is consistent with the community land use plan with the exception of four changes made to reflect site conditions and additional community requests that arose subsequent to preparation of the Community Land Use Plan. These changes include: 1) relocating the Subarea 2 parking lot and associated signs, picnic and restroom facilities and paved trails from the middle to south end of the subarea to reduce the need to clear existing vegetation; 2) eliminating the children's fishing pond because it would require significant dredging of an existing wetland; 3) utilizing stairs, rather than a handicap accessible ramp to access Subarea 2 from the Towe-Ford Museum parking lot due to the difficulty of excavating a ramp into the existing embankment; and 4) adding an additional natural surface trail west of the Old Prison.

Upon completion of construction, the project area will be revegetated with riparian and upland grasses and flowers (Section 4.10).

Interim erosion control measures will be implemented prior to the commencement of construction operations and maintained until establishment of vegetation to reduce the transport of eroded materials into the river or adjacent vegetated areas (Section 4.11)

Upon completion of construction activities, periodic inspections of the site will be made. The inspections will evaluate the success of vegetation, address erosion problems, if any, and identify solutions to these problems, if required. There will be post-construction monitoring and a maintenance plan.

## 2.4.1 Permits and Authorizations

### 2.4.1.1 Permits and Authorizations Issued

Based on the Subarea 2 design proposal, the following permits and authorizations were required and obtained:

- ▶ **Montana Stream Preservation Act - 124 Permit:** Issued by the Department of Fish, Wildlife and Parks on Oct. 22, 1996 (Based on the proposal, it was determined the project would not cause significant turbidity and a state 3-A Authorization would not be required.)
- ▶ **404 Wetlands Permit:** Issued by the U.S. Army Corps of Engineers (COE) Oct.25, 1996. The DEQ waived its 401 Review.



- ▶ **Flood Plain Development Permit:** Issued by Powell County on Sept. 13, 1996.
- ▶ **Montana Pollutant Discharge Elimination System General Permit to Discharge Storm Water Associated With Construction Activity:** Issued by the DEQ on Oct. 1, 1996.

#### 2.4.1.2 Other Permits and Authorizations

Other possible permits and authorizations include:

- ▶ **Improvement Request Form:** DNRC has a policy where improvements to leased property must be approved prior to being placed on state property. Once a completed EA is in place and an alternative selected, the DNRC will adjust the lease accordingly.
- ▶ **DNRC Land Use License:** The Clark Fork River is claimed by the state as a navigable river, as such, a Land Use License (LUL) is necessary for any structures placed within boundaries of the low water mark. A license may be necessary for some of the riprap along the river bank. It is unclear if the fishing deck will need a LUL.

#### 2.5 Subareas 3 and 4

Although no specific plans and specifications have been made for Subareas 3 and 4, it is likely they will require permits similar to those needed for Subarea 2.

Subarea 3 has a small amount of river frontage land which contains tailings deposits. The DOC owns approximately the northern half of the property. The state's Department of Transportation (DOT) owns the former highway (Valley View Drive) that serves as the eastern border for the subarea. If this subarea is developed, it is anticipated the developers will apply to DOT to widen the access from Main Street to the old highway.

Any substantial changes to the development of Subareas 3 and 4 will be referenced as addendums to this EA.

#### 3.0 GOVERNMENT AGENCIES AND JURISDICTIONS:

Due to the location of this proposed project, a number of local, state and federal agencies are involved and interested in the SDLEIP. The agencies include:





- ▶ **Powell County** - In addition to its floodplain development permitting responsibilities, the county's planning office is also working with all parties to insure the development conforms to county long-range plans.
- ▶ **DOC** - It is the owner of the property and has been designated as the lead state agency for this EA. The DOC will make the final decision on how the state should proceed.
- ▶ **DNRC** - As the land manager for DOC, it administers the lease with the City of Deer Lodge (Lease #5248).
- ▶ **DOT** - Although not directly involved in Subarea 2, it will be involved when Subarea 3 is developed.
- ▶ **DEQ** - This agency is involved in several program areas. In addition to its reviews for storm water and wetlands, the applicant would need to obtain a short-term authorization to temporarily disturb water quality if DFWP deems it appropriate in its 124 Permit review. Beyond permitting, the DEQ is working in conjunction with EPA on the Clark Fork Superfund Site.
- ▶ **DFWP** - In addition to its 124 Permit responsibilities, DFWP is also interested in activities which will improve water quality and wildlife habitat.
- ▶ **Natural Resource Damage Program (NRDP)** - A \$765 million lawsuit has been prepared by the NRDP on behalf of the state against ARCO for environmental damage caused by mining and smelting in Butte and Anaconda. The state believes that is the amount of money needed to restore stream and wildlife habitat damage. The NRDP claim is allowed under the federal Superfund law. The state's lawsuit is intimately related to ARCO's cleanup activity in the Clark Fork River Basin, including the proposed SDLEIP.
- ▶ **EPA** - It is the lead agency in the Clark Fork River Operable Unit of the Milltown Reservoir Sediments Superfund Site.
- ▶ **COE** - This agency administers the 404 Wetlands Program.

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that this is crucial for ensuring transparency and accountability in the organization's operations.

2. The second part of the document outlines the various methods and tools used to collect and analyze data. It highlights the need for consistent and reliable data collection processes to support effective decision-making.

3. The third part of the document focuses on the role of technology in data management and analysis. It discusses how modern software solutions can streamline data collection, storage, and reporting, thereby improving efficiency and accuracy.

4. The fourth part of the document addresses the challenges associated with data management, such as data quality, security, and privacy. It provides strategies to mitigate these risks and ensure that data is used responsibly and ethically.

5. The fifth part of the document concludes by summarizing the key findings and recommendations. It stresses the importance of ongoing monitoring and evaluation to ensure that data management practices remain effective and aligned with the organization's goals.

6. The sixth part of the document provides a detailed overview of the data collection process, including the identification of data sources, the design of data collection instruments, and the implementation of data collection procedures.

7. The seventh part of the document discusses the various methods used for data analysis, such as descriptive statistics, inferential statistics, and regression analysis. It explains how these methods can be used to interpret the data and draw meaningful conclusions.

8. The eighth part of the document focuses on the presentation of data, including the use of tables, charts, and graphs. It provides guidelines for creating clear and concise reports that effectively communicate the results of the data analysis.

9. The ninth part of the document discusses the importance of data security and privacy. It outlines the measures that should be taken to protect sensitive data from unauthorized access and ensure compliance with relevant regulations.

10. The tenth part of the document provides a final summary and concludes the report. It reiterates the key findings and offers final recommendations for improving data management practices in the future.

## IMPACTS ON THE PHYSICAL ENVIRONMENT

RESOURCE	POTENTIAL IMPACTS AND MITIGATION MEASURES - [Y] = Impacts may occur, [N] = Not present or no impact will occur, and [U] = Unknown
A. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE: Are soils present which are fragile, erosive, susceptible to compaction, or unstable? Are there unusual or unstable geologic features? Are there special reclamation considerations?	[Y] The presence of tailings deposited from mining and smelting in the Butte/Anaconda area is a major concern for this proposed project. Although the project was designed to remediate contaminated areas (Reference 4.2, 4.10, 4.11, 4.12 and 4.13), a debate remains whether the proposed method of reclamation is the best long-term solution (Reference 5.0 through 5.4).
B. WATER QUALITY, QUANTITY AND DISTRIBUTION: Are important surface or groundwater resources present? Is there potential for violation of ambient water quality standards, drinking water maximum contaminant levels, or degradation of water quality?	[Y] A Storm water discharge permit has been issued for Subarea 2 by DEQ. The proposed streambank work did not need a short-term authorization to disturb water quality, according to DFWP. The COE issued a 404 Wetlands Permit for the project, and the DEQ waived its subsequent review (Reference 2.4.1)
C. AIR QUALITY: Will pollutants or particulate be produced? Is the project influenced by air quality regulations or zones (Class I airshed)?	[N]
D. VEGETATION COVER, QUANTITY AND QUALITY: Will vegetative communities be significantly impacted? Are any rare plants or cover types present?	[Y] Streambank stabilization and revegetation of treated tailings areas both are aimed at enhancing the existing flora (Reference 4.3, 4.10, and 4.11)
E. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS: Is there substantial use of the area by important wildlife, birds or fish?	[Y] Since the plan for Subarea 2 is to enhance the natural qualities of the area, the desired result will be to improve the natural habitat for both fish and wildlife (Reference 4.3, 4.9.1, and 4.10). The area is inhabited by mostly small game animals, but also provides cover for deer. Because of its setting and close proximity to Deer Lodge, the area has been, and will be continued to be, used as a natural area by local science teachers.
F. UNIQUE, ENDANGERED, FRAGILE OR LIMITED ENVIRONMENTAL RESOURCES: Are any federally listed threatened or endangered species or identified habitat present? Any wetlands? Species of special concern?	[Y] There are no known federally designated threatened or endangered species in the area. The project is designed to retain and enhance wetlands (Reference 2.4.1, 4.10, 4.11, and 4.12). Bald eagles have been sighted in the upper Clark Fork River Valley, although it is unknown if any reside in the project area, according to a 1994 inventory done for ARCO by the University of Montana's School of Forestry.
G. HISTORICAL AND ARCHAEOLOGICAL SITES: Are any historical, archaeological or paleontological resources present?	[Y] Reference 4.14.



### IMPACTS ON THE PHYSICAL ENVIRONMENT

<p>H. AESTHETICS: Is the project on a prominent topographic feature? Will it be visible from populated or scenic areas? Will there be excessive noise or light?</p>	<p>[Y] At full development, the aesthetics will be diverse. Subareas 1, 2 and 4 will emphasize natural qualities, while Subarea 3 will be more similar to an urban recreational area.</p>
<p>I. DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR OR ENERGY: Will the project use resources that are limited in the area? Are there other activities nearby that will affect the project?</p>	<p>[N]</p>
<p>J. IMPACTS ON OTHER ENVIRONMENTAL RESOURCES: Are there other activities nearby that will affect the project?</p>	<p>[Y] The Clark Fork River operable unit (Reference 5.1) and Montana's NRDP lawsuit (Reference 5.3) could influence the proposed project.</p>

### IMPACTS ON THE HUMAN POPULATION

<p>A. HUMAN HEALTH AND SAFETY: Will this project add to health and safety risks in the area?</p>	<p>[U] Once the RI/FS has been completed, more will be known about any possible health risks (Reference 5.5).</p>
<p>B. INDUSTRIAL, COMMERCIAL AND AGRICULTURAL ACTIVITIES AND PRODUCTION: Will the project add to or alter these activities?</p>	<p>[N] Much of the land is marginal pasture land.</p>
<p>C. QUANTITY AND DISTRIBUTION OF EMPLOYMENT: Will the project create, move or eliminate jobs? If so, estimated number.</p>	<p>[N]</p>
<p>D. LOCAL AND STATE TAX BASE AND TAX REVENUES: Will the project create or eliminate tax revenue?</p>	<p>[N]</p>
<p>E. DEMAND FOR GOVERNMENT SERVICES: Will substantial traffic be added to existing roads? Will other services (fire protection, police, schools, etc.) be needed?</p>	<p>[Y] It is anticipated there will be an increase in traffic, but this is considered in the planning for in Subarea 2 and the SDLEIP in general. Also provisions have been made for weed control and post monitoring and maintenance (Reference 4.4, 4.10, and 4.12).</p>
<p>F. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS: Are there State, County, City, USFS, BLM, Tribal, etc. zoning or management plans in effect?</p>	<p>[Y] The SDLEIP conforms to county long-range plans (Reference 3.0). The area also is part of a Superfund site and is included in the state's NRDP lawsuit against ARCO (Reference 2.2, 3.0, 5.1, and 5.3).</p>
<p>G. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITIES: Are wilderness or recreational areas nearby or accessed through this tract? Is there recreational potential within the tract?</p>	<p>[Y] A major part of the planning for the SDLEIP is to increase the recreational potential for the area.</p>



<b>IMPACTS ON THE HUMAN POPULATION</b>	
H. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING: Will the project add to the population and require additional housing?	[N]
I. SOCIAL STRUCTURES AND MORES: Is some disruption of native or traditional lifestyles or communities possible?	[N]
J. CULTURAL UNIQUENESS AND DIVERSITY: Will the action cause a shift in some unique quality of the area?	[N]
K. PRIVATE PROPERTY IMPACTS: Is the state regulating the use of private property under a regulatory statute adopted pursuant to the police power of the state? (Property management, grants of financial assistance, and the exercise of the power of eminent domain are not within this category.) If not, no further analysis is required.	[N]
L. PRIVATE PROPERTY IMPACTS: Does the proposed regulatory action restrict the use of the regulated person's private property? If not, no further analysis is required.	[N]
M. PRIVATE PROPERTY IMPACTS: Does the agency have legal discretion to impose or not impose the proposed restriction or discretion as to how the restriction will be imposed? If not, no further analysis is required. If so, the agency must determine if there are alternatives that would reduce, minimize or eliminate the restriction on the use of private property, and analyze such alternatives.	[N]
N. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:	[Y] The beautification project has the potential to attract and encourage tourists to spend more time in Deer Lodge and the surrounding area.

#### 4.0 **DESIGN AND MITIGATION:**

There are a number of components to the SDLEIP Subarea 2 design. They include: site preparation, in-situ lime amendment of tailings, streambank stabilization, signs, a parking area, trail system, pedestrian bridges, boardwalks, fishing deck, picnic areas, restroom and revegetation.





#### 4.1 Site Preparation

Site preparation at Subarea 2 will consist of preparing the site for in-situ treatment and trail construction. This will involve debris removal and fence removal.

#### 4.2 Lime Amendment Design for Tailings

Metals found in mine tailings have been shown to adversely affect plant and animal life.

Historic mine tailings are often acidic (pH 3-5) and contain elevated levels of undissolved and dissolved metals and arsenic. The addition of lime results in an increase in the pH of the tailings, which in turn decreases the solubility of metals in the tailings pore water (water which fills in the space between particles). This can result in a decrease in the amount of metals moving through the tailings via infiltration and percolation. Additionally, the neutral pH and lower metal concentrations allow for the establishment of vegetation, which can also serve to decrease infiltration via evapotranspiration as well as decrease the amount of runoff and erosion from the tailings. It should be noted that while the solubility of most metals (copper, lead and zinc) decreases greatly above the pH of approximately 6 to 7.5, arsenic may become more soluble when lime is added. However, the actual mobility of arsenic is often controlled by adsorption to iron and manganese oxides, which are common in tailings and soils.

Approximately five to six acres of Subarea 2 (including the parking area and berms) will be amended in-situ with lime as determined by visual identification of exposed tailings, previous riparian mapping performed by the University of Montana, and test pit sample analyses (Enclosure 4).

Test pit analyses identified tailings from depths of a few inches up to 24 inches. Composite soil sample analyses indicate that a lime amendment application rate of 50 tons/acre will be appropriate for neutralizing the tailings and providing conditions conducive to revegetation these exposed tailings areas, with the exception of the berm in the southern portion of the project. This area will require approximately 200 tons/acre. Lime application rates are based on acid-base accounting analyses and Shoemaker, McLean and Pratt single buffer method analysis for the soil samples collected. Western Reclamation, Bozeman, MT, will perform the tailings amendment.

Within the tailings patch areas, approximately 75 percent of the lime required will be applied and incorporated using multiple passes with a Baker plow to a



depth of 24 inches. The remaining 25 percent will be used for "topdressing" the top six to eight inches using an agricultural disc. Berm application rates were derived using a 12-inch incorporation depth. Lime material will be supplied by Holnam Inc., Three Forks, MT, or Continental Lime, Townsend, MT. Both potential sources are of similar quality.

#### 4.3 Streambank Stabilization

Streambank stabilization will occur along approximately 400 feet in Subarea 2 (Enclosure 3). The bank will be stabilized using three different stabilization techniques, each designed to accommodate existing conditions along the bank and increase the potential for vegetation development along the bank.

The upstream 100-foot section of bank will be stabilized using a rootwad revetment technique. This will involve the placement of rootwads from large trees (i.e. fir) in the bank by excavating material from the bank and burying the trunk of the rootwad in the bank. The rootwad will protrude from the bank into the river to serve as an interim barrier against the river current. Rock and transplanted willows will be placed behind the rootwad. The rootwad will serve as short-term protection until the willows can establish and a vegetative root mass has formed in the bank.

The central 100-foot section of bank will be stabilized by planting willow shoots along the bank. Additionally, riprap will be placed along the toe of the bank where there is an existing power pole. The riprap will be placed in front of the pole and along both sides. Transplanted willow shoots will be placed behind and along the sides of the pole.

The downstream 200-foot section will be stabilized using a terraced stabilization technique. This entails reconstruction of the bank in terraced lifts using existing bank material and coconut fiber. Riprap will be placed on the bank below the terrace reconstruction to stabilize the lower bank at, and below, the water level. The streambank stabilization work will reduce the natural rate of erosion on the bank prior to revegetation.

Coconut matting will be placed and stapled to the bench using rebar staples, a bio-log<sup>®</sup> (coconut fiber compressed into a log shape) will be placed at the front of the excavated bench, and existing bank material will be placed back in the bank on top of the matting. The coconut matting will then be folded back over the fill material and secured using rebar staples. This process will be repeated on top of the first terrace, except that the bio-log<sup>®</sup> will be replaced with an additional layer of coconut matting at the front of the bench. Willow cuttings will be sandwiched between the terraces protruding

THE UNIVERSITY OF CHICAGO  
DEPARTMENT OF CHEMISTRY  
5800 S. UNIVERSITY AVENUE  
CHICAGO, ILLINOIS 60637

RECEIVED  
DATE

BY

FROM

ADDRESS

CITY

STATE

ZIP

out over the bank to help establish vegetation on the streambank. Fill material is then placed over the terraces and revegetated.

Bank stabilization construction will begin with the upstream section and proceed downstream. Where possible, existing shrub vegetation along the bank will be salvaged and replanted during stabilization of the banks. It is anticipated Five Rivers, Inc., Bozeman, MT, will do the bank stabilization work.

#### **4.4 Access/Parking Area**

An approximately 24-foot wide access ramp off Main Street will be constructed in accordance with DOT guidelines. The access ramp will be constructed by placing fill material overlain by crushed base course material, to provide a smooth driving surface. A culvert will be placed beneath the access ramp to maintain drainage and an entrance sign will be placed at the access ramp.

The parking area for Subarea 2 will be constructed in a lowland meadow in the southern portion of the project. This area was selected in part due to the presence of a rocky, poorly vegetated subgrade to provide a smooth driving surface. Fill material will be used if necessary to level the existing surface. The parking area was designed to accommodate about 15 standard vehicles, two recreational vehicles and two designated handicapped parking spaces. The parking area will be connected to the trail system, with paved trail access to the Clark Fork River and other recreational features.

#### **4.5 Trail System**

As part of the final land use plan, a trail network will be created to provide access to park features and the river. Subareas 1 and 2 will encompass approximately 5,000 feet of compacted crushed gravel trails, 3,750 feet of asphalt paved trails and 1,700 feet of improved natural surface trails. The trail system generally parallels the Clark Fork River, while also allowing access to the Old Prison Museum, around various wetlands, and to park features including a constructed fishing deck. These trails traverse the many wetlands and drainages by use of pedestrian bridges, boardwalks and culverts. Additionally, the trail system was designed in accordance with the American With Disabilities Act accessibility guidelines.

The surface of outdoor recreation access routes will be stable, firm and slip resistant. Soft, loose surfaces, such as loose sand or gravel, wet clay and irregular surfaces, such as cobblestones, can significantly impede the

THE UNIVERSITY OF CHICAGO

PHYSICS DEPARTMENT

PHYSICS 435

LECTURE 1

1.1

1.2

1.3

movement of a wheel chair and create slipping and tipping hazards for people using other mobile aids. Surface material will be aesthetically appropriate and commensurate with visitor expectations. Asphalt, well maintained compacted crushed stone, and wood decking will be used to meet these requirements.

Trails and paths in outdoor recreation sites, such as Subarea 2 fall into two categories:

- ▶ Paths that provide access to the site's primary developed recreation elements (access routes) which are typically less than a quarter of a mile; and
- ▶ Paths that provide access to the site's other, less-developed recreation elements (recreational trails). These trails are typically a quarter of a mile or more in length, connecting the lesser developed recreation activities with the site's access points.

#### **4.6 Pedestrian Bridge**

A prefabricated pedestrian bridge will be used to cross Peterson Creek at the base of the stair entrance at the Old Prison Museum.

#### **4.7 Boardwalks**

Boardwalks will be constructed to cross wetlands. Unlike the bridge, the boardwalks will be constructed in the field with treated timber. Concrete supports will be cast in place below the frost line for foundations.

#### **4.8 Signs**

Signs will include: entrance signs, parking delineation signs for handicapped and recreational vehicle parking, information kiosks and directional signs.

#### **4.9 Park Features**

##### **4.9.1 Fishing Deck**

A handicapped accessible fishing deck will be constructed in Subarea 2 in an attempt to increase recreational use of the Clark Fork River. The deck will be connected to the parking area with a paved access trail. The deck will be approximately 16 feet wide, accommodating two or three anglers with ample maneuvering space. A safety rail and benches on the deck will also be

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that this is crucial for ensuring transparency and accountability in the organization's operations.

2. The second part of the document outlines the various methods and tools used to collect and analyze data. It highlights the need for consistent data collection procedures and the use of advanced analytical techniques to derive meaningful insights from the data.

3. The third part of the document focuses on the implementation of data-driven decision-making processes. It provides a detailed overview of the steps involved in identifying key performance indicators (KPIs) and using data to inform strategic decisions.

4. The fourth part of the document discusses the challenges and risks associated with data management and analysis. It addresses issues such as data quality, privacy concerns, and the potential for bias in data-driven decisions.

5. The fifth part of the document provides a summary of the key findings and recommendations. It emphasizes the importance of ongoing monitoring and evaluation to ensure that the data-driven approach remains effective and relevant over time.

6. The sixth part of the document includes a list of references and sources used in the research. It provides a comprehensive overview of the literature and resources that informed the analysis and conclusions.

7. The seventh part of the document contains a list of appendices and supplementary materials. These include detailed data sets, charts, and tables that provide additional context and support for the findings presented in the main text.

8. The eighth part of the document includes a list of acknowledgments and a list of authors. It expresses gratitude to the individuals and organizations that provided support and resources throughout the project.

9. The ninth part of the document contains a list of contact information and a list of related documents. It provides a way for readers to get in touch with the authors and access additional resources related to the research.



constructed.

#### 4.9.2 Picnic Shelters and Tables

A prefabricated picnic shelter will be installed on a cast-in-place concrete pad in close proximity to the parking area in Subarea 2. The picnic shelter will be approximately 400 square feet in area and accommodate two precast, concrete picnic tables.

Three additional picnic tables will be installed at various locations adjacent to the paved trails.

#### 4.9.3 Restrooms

One precast handicapped accessible restroom will be installed adjacent to the Subarea 2 parking lot. This totally enclosed unit is appropriate for construction within the floodplain and will be installed above the ground water table.

#### 4.10 Revegetation and Weed Management

The revegetation goal of the SDLEIP is to establish a permanent, native, herbaceous cover along the Clark Fork River at the entrance to the City of Deer Lodge. The vegetation will provide a functional, low maintenance plant cover which is intended to stabilize the amended tailings and enhance the use of the project areas as a recreational area.

Existing plant species within this project area have been used as a guide to revegetation. Two predominately grass and forb seed mixtures have been designed: one for moist, wetland sites; and one for drier upland sites. A variety of different grass species have been selected to "blend" with the native vegetation. Seeding lines or boundaries between existing herbaceous vegetation and reseeded species will not exist as specific species seek their preferred growth medium.

Upon completion of in-situ soil remediation, the areas impacted by construction activities will be reseeded via hand broadcast seeding or drill seeding using selected mixtures of native grasses (Enclosure 5). In general, three broad plant community associations have been developed to provide the framework for vegetation. The three areas consist of:

- ▶ Mix I will be used along the outer edges of the wetland areas and for any wetland areas disturbed during culvert or bridge placement;



- ▶ Mix II will be used along high profile areas, such as the base of the entrance sign, along the trails and along the parking areas; and
- ▶ Mix III will be used for the majority of the site disturbed by construction activities.

Some fall weed spraying was done in 1996 to kill knapweed rosettes. It is planned that in the summer of 1997 spraying of half-strength Tordon will be used to kill adult knapweed plants and avoid damage to new grass. Full strength applications will be used in areas not reseeded and where knapweed is a problem. Areas immediately adjacent to waterways will not be sprayed with any chemicals. Hand pulling will be done in these areas.

#### **4.11 Erosion Control**

Erosion Control devices will be used to minimize the amount of sediment picked up and transported from the in-situ amendments and other work areas to existing vegetated areas and the Clark Fork River. Erosion control devices, such as silt fence and straw bales, will be installed prior to commencement of construction operations to accomplish this objective. Erosion control devices will be maintained until establishment of vegetation occurs. Approximate locations for the erosion control devices will be determined in the field by the oversight engineer prior to construction.

As part of the state's storm water permit, the developers have submitted, and the DEQ has subsequently approved, an erosion control plan.

#### **4.12 Post-Construction Monitoring and Maintenance**

Maintenance activities to be performed upon completion of construction will include periodic visual inspections of the site for vegetation success and excessive erosion. The critical window for these inspections is during the interim period prior to the establishment of vegetation across the site. These inspections will help reduce potential for long-term, costly maintenance. Simple maintenance procedures will be performed during these inspections such as: removal of accumulated material at the base of the erosion control features; periodic restaking of silt fence posts; removal of garbage or litter that might have accumulated on site; and hand seeding of unvegetated areas as needed.

Although Subarea 2 work at the SDLEIP is not a formal Clark Fork River Operable Unit Demonstration Project, some monitoring of revegetation success is anticipated. The specific components and time frame of the



monitoring plan will be developed in conjunction with the EPA and DEQ. However, it is anticipated that vegetation monitoring would include a qualitative assessment to determine seeding success in the fall of 1997 and follow-up vegetation cover and species composition measurements in subsequent years.

Monitoring information from this treatability testing project will likely be similar to information gathered at Subarea 1 and the Governor's Clark Fork River demonstration projects.

#### 4.13 Reporting and Record Keeping

An oversight engineer will monitor the implementation of the design at the SDLEIP for the duration of construction activities. Daily project logs will be completed by the oversight engineer, documenting construction activities and field design modifications, if any.

#### 4.14 Historic Sites

As part of the COE 404 Permit review, a letter was sent to the agency from the State Historic Preservation Office (SHPO) indicating there are seven recorded historic sites in the area of Subarea 2 (Section 4 and 9, Township 7 North, Range 9 West). None of the sites are situated in the bounds of the subarea, and according to SHPO, its database indicates there have been no previous cultural inventories of this area. Additionally, there are no known archaeological or paleontological sites in Subarea 2.

The COE "recommended" that a cultural resources survey be conducted prior to initiating any earth disturbing activities.

Prior to the development of refrigeration appliances, Prison personnel dug a diversion channel to a flat, graded area in the central part of Subarea 2 and used water from the Clark Fork River to create a shallow pond where ice could form, and subsequently, cut into blocks. The dirt berms are the only remnants of this operation.

### 5.0 **MAGNITUDE AND SIGNIFICANCE OF POTENTIAL IMPACTS:**

#### 5.1 **Clark Fork River Superfund Unit**

Dozens of community improvement and beautification projects occur each year in Montana. The SDLEIP is no different than many of these projects, except for the fact it is within the Clark Fork River Superfund Operable Unit.

THE UNIVERSITY OF CHICAGO  
DEPARTMENT OF CHEMISTRY  
5800 S. UNIVERSITY AVENUE  
CHICAGO, ILLINOIS 60637  
TEL: (773) 835-3100

RESEARCH INTERNSHIP PROGRAM  
SUMMER 2008

APPLY TO: DR. [Name]  
[Address]  
[City, State, Zip]

INTERESTED APPLICANTS SHOULD  
CONTACT THE PI AT [Phone Number]  
OR VISIT THE WEBSITE AT [URL]

FOR MORE INFORMATION, CONTACT  
[Name]  
[Address]  
[City, State, Zip]

ADDITIONAL INFORMATION IS AVAILABLE  
AT [URL]

FOR A COMPLETE LIST OF RESEARCH  
INTERNSHIP OPPORTUNITIES, VISIT  
[URL]

By itself the proposed project is not technically difficult, but because it is situated within the bounds of a Superfund site, the circumstances are involved. The presence of tailings and soils with elevated metals and arsenic represents an uncontrolled release of hazardous substances.

From the government agencies standpoint, the ideal approach for addressing a Superfund site is for the RI/FS to occur, then based on the studies, the ROD selects the best options for cleaning up the site. In reality, this is not the way events have occurred in the Clark Fork River Operable Unit. The work done under the auspices of a demonstration project in Subarea 1 is an example of projects that have been approved prior to the completion of the RI/FS, however, it would not be appropriate to state that work done in Subarea 1 was a sanctioned cleanup.

In addition to the CERCLA work, the State of Montana's \$765 million damage lawsuit against ARCO adds another level of consideration to any natural resource remediation or restoration work done in the area.

#### 5.1.1 EPA and DEQ

Although EPA and DEQ would prefer that Superfund projects proceed according to an established sequence of events, both agencies recognize this does not always happen.

The EPA and DEQ also recognize that developing positive and cooperative attitudes amongst private landowners and communities are essential elements in any successful Superfund cleanup.

This is not to say that just any proposal is acceptable if a person or community wants an area cleaned up. Rather, the responsible federal and state agencies are more inclined to look favorably on proposals which accurately identify problem areas, propose solutions based on proven scientific and technical methods, and have the support of landowners and local communities.

The EPA and DEQ support the spirit of the City of Deer Lodge, Powell County and the private landowners in taking the initiative to improve conditions in the SDLEIP. Although a more extensive treatment, removal or simply leaving tailings in place covered by several feet of soil and vegetation might prove to be more desirable options, the agencies believe the voluntary efforts by ARCO and Deer Lodge will not make conditions worse at and near the river. Additionally, this also should not imply that conditions will be necessarily improved.





When it is time to select the remedy for sites in the operable unit, the EPA and DEQ will assess to what extent the work done at the SDLEIP, and other demonstration and pilot projects, augments the remedy and whether they should be modified.

## 5.2 DFWP' Fisheries Position

DFWP has reviewed and issued Stream Preservation Act (SPA) permits for Subareas 1 and 2. The Subarea 2 review considered the streambank stabilization proposals and placement of the fishing platform.

The agency does not intend that its responsibilities for reviewing and approving SPA permits should be interpreted as an endorsement of, or cooperation in, the SDLEIP.

In a letter to the EPA (Jan. 14, 1997), DFWP Region 2 Fisheries Manager Dennis Workman said:

Fish, Wildlife and Parks believes that the aesthetic improvements to the area have been significant and is sympathetic to the wishes of the Deer Lodge community to improve the appearance of the area. It is not possible for FWP to be more supportive of the project since we believe the technologies used to address the gross metals pollution at this site are not adequate to allow improvement of the Clark Fork River fisheries. Should projects be initiated that use appropriate treatments for the abatement of metals pollution, we would be pleased to cooperate.

Whereas we support the removal of toxic soils along the Mill/Willow bypass, and anywhere they exist,...

We have learned through many years of scientific investigation that the metals found in the sediments, soils and waters of the Clark Fork River are capable of killing and otherwise adversely affecting fish health. We have also learned that excursions of metal levels above water quality standards need not be frequent to effectively deny the fishery its full potential. Until the river is denied its source of toxic metals, and exceedence of standards is eliminated, the fishery will be impaired.

THE UNIVERSITY OF CHICAGO  
DEPARTMENT OF CHEMISTRY

PHYSICAL CHEMISTRY  
PROFESSOR [Name]

LECTURE NOTES

CHAPTER 1

1.1. Introduction

1.2. Thermodynamics

1.3. Kinetics

### 5.3 NRDP Considerations

The aim of the federal Superfund program is remediation or to return an area to a level in which there are no unacceptable current or potential risks to human health and the environment. The goal of the state's NRDP lawsuit is restoration. The aim of restoration is to return the area to conditions that would exist absent the presence of metals and mine tailings..

The state's NRDP outlined its views on the SDLEIP in a letter from Assistant Attorney General Robert G. Collins to DNRC (Nov.14, 1996):

You should also be aware that unless this project is modified in certain respects, it would be inconsistent with the (NRDP's) Restoration Determination Plan adopted by the State of Montana as part of its natural resource damage assessment performed for the Upper Clark Fork River Basin, which has been submitted as one basis for the State's damage claims in Montana v. ARCO....The project area, including the streambanks, is laced with a substantial amount of contaminated tailings from upstream mining operations for which ARCO is liable. The State's restoration plan requires the removal of these tailings as well as backfilling the area with clean soil, streambank stabilization and revegetation which would help restore the river and its fishery to baseline conditions. The conflict arises because the project does not contemplate tailings removal and backfilling, nor the same degree of revegetation and bank stabilization. We would suggest that this inconsistency could readily be resolved if the project were modified to include tailings removal and backfilling and appropriate revegetation and stabilization of the riverbanks. In other words, it appears that this project (including its picnic areas, benches, parking lot, trails, and fishing access) could be readily integrated with the key elements of the State's restoration plan and the goals of both could be met without great changes in the design.

I would like to emphasize that if the above suggestion is not acceptable, the NRDP's position on whether this project should be approved has not been finalized. If a conflict among the affected agencies develops, this would be the type of matter which should be submitted to the NRDP Policy Committee for resolution. (The NRDP Policy Committee consists of the directors of FWP, DEQ, DNRC, the Governor's Chief of Staff, and the Attorney General.)

Finally, if the State should ultimately approve the project, I would



appreciate your suggestion that the NRDP assist in the drafting of legal documents which would seek to preserve the State's position in the lawsuit and, presumably, not allow ARCO to use such approval, or this project, against the State.

#### 5.4 Removal of Tailings vs In-Situ Treatment

The completion of the RI/FS and ROD will determine which tailings areas should be treated in-situ, which areas should be removed, and which should be left undisturbed. The ROD will only identify the combination of remedial technologies that would be employed and the criteria under which those technologies would be required. The identification of specific areas requiring a type of remediation technology would be determined in the remedial design. Prior to the completion of that process, agencies and individuals can only look at cleanup proposals, study them, consider the recommendations and support or not support them. This does not allow these agencies to look at proposals in the larger context of total remediation, but it also does not preclude approving these projects with the provisions that, if future studies determine removal of certain tailings is the right thing to do, then recommend removal of the tailings at that time.

#### 5.5 Human Health Risk Assessment

The EPA contracted with ROY F. WESTON, INC. to produce a *Baseline Human Health Risk Assessment for the Clark Fork River Operable Unit of the Milltown Reservoir Sediments National Priority List*. A draft form of the document is presently being reviewed by government personnel and the public.

The study area was defined as the area within the current and historic 100-year flood plain of the Clark Fork River between the headwaters of the river (where Warm Springs Creek joins the outflow of the Warm Springs Ponds, east of Anaconda, MT) and the Milltown Reservoir, south of Missoula, MT.

The study focused on the potential concern to both humans and ecological sources from extensive tailings deposits in and along the river. The risk assessment is only for human health. An ecological risk assessment is currently being prepared by EPA. The human health risk assessment also considered contaminated surface and ground water. These tailings contain a variety of different metals and metalloids. The chemicals of potential concern including: antimony, arsenic, beryllium, cadmium, copper, iron, lead, manganese, mercury and zinc.



The exposed human population scenarios were represented by the following groups: residents, ranchers/farmers, hunters/fisherman and recreational visitors. The level of human exposure was evaluated using standard equations and methods recommended by EPA for use at Superfund sites.

Information on the inherent toxicity of each chemical of potential concern was obtained from databases and documents provided by EPA.

The EPA has developed a standard set of equations for estimating the risk to members of a human population under a specified set of exposure conditions. These basic equations were used to estimate cancer and noncancer risk from human exposure to the chemicals of potential concern, using as much site-specific information on human exposure conditions as possible.

#### 5.5.1 Soils/Tailings

The draft assessment indicates, "Noncancer and cancer risks from exposure to soil and tailings are dominated by arsenic, and no other chemical poses risks in a range of concern."

Screening levels were done using available information and an extensive data set collected at the Grant-Kohrs Ranch, north of Deer Lodge. The risk estimates were "generally similar" and supported the view that cancer risks from arsenic were within the "typically acceptable risk range (one exposure per 10,000 persons to one exposure per 1,000,000 persons)" for all scenarios except residents exposed in "Zone 1." DEQ has not formally agreed that this is the acceptable range of acceptable risk. According to the draft report, "Information from aerial surveys indicates that there is at most one residence located in Zone 1 of Reach A, and because this zone is in the flood plain, it is considered very unlikely that significant future residential development will occur in this area." Zone 1 of Reach A is the area around the headwaters of the Clark Fork River, east of Anaconda.

#### 5.5.2 River Water

Two populations were cited in the study as being most likely to be exposed to river water: swimmers, rafters and persons in inner tubes and anglers. People participating in water sports can be exposed by swallowing water or having water come in contact with skin. Concerns for anglers is exposure to skin.

For both groups, noncancer hazards are below a level of concern for all chemicals. The draft says, "This indicates that chemicals dissolved in the

THE UNIVERSITY OF CHICAGO  
DEPARTMENT OF CHEMISTRY  
5800 S. UNIVERSITY AVENUE  
CHICAGO, ILLINOIS 60637

RECEIVED: [illegible]

[illegible text]

[illegible text]

[illegible text]

[illegible text]

[illegible text]

[illegible text]

[illegible text]



river are not of noncancer risk to humans.”

Cancer risks range from 0.4 to 1 per million for recreationalists and anglers under average conditions. The report says:

...Most of this estimated risk is due to the assumed dermal (skin) absorption of beryllium. This calculation of risks from dermal absorption of beryllium is especially uncertain, since it is based on the assumption that dermal absorption of beryllium occurs quite readily, even though oral absorption of beryllium is very small. Therefore, these risk estimates could be significantly higher than actual.

#### 5.5.3 Pooled Water

Although available data are not sufficient to support reliable risk calculations for this exposure possibility, the draft report suggests that risks are not likely to be of significant concern to recreational visitors.

#### 5.5.4 Food-Chain Pathways

Available information is not adequate to support reliable risk calculations, although limited data support the view that concentrations are below a level of significant concern in locally raised beef, fish from the Clark Fork River and waterfowl from the Warm Springs Ponds area, according to the draft assessment.

#### 5.5.5 Lead

The study reveals typical lead levels in soils and tailings appear to be at or below EPA's default acceptable level of 400 parts per million (ppm) at most locations, although "...some accedences may occur in Zone 1 of Reach A." Because 400 ppm is believed to protect young children in residential settings, the draft report concludes that "...exposure to lead in soil is unlikely to be of significant health concern for residents, ranchers, or recreational visitors at most locations within the operable unit (Warm Springs Ponds to Milltown Dam), except for current or future residents in Zone 1 of Reach A."

#### 5.5.6 Multiple Pathways

A person who is a resident, a rancher and an angler might be exposed through multiple pathways. There are a large array of possible scenarios regarding these possible exposures. In the draft report several scenarios were considered. The examples revealed that at a particular site, total risk to



an individual is usually dominated by one or two of the multiple pathways, and that adding multiple pathways rarely increases risk by more than a factor of two from the risk due to the main pathway. DEQ has officially agreed with EPA's approach to determining multiple pathways.

#### 5.5.7 Implications for the SDLEIP

The substantive comments derived from the public review of the EPA's human health risk assessment draft study will be incorporated into the report and a final document will be released in late summer or early fall of this year. Preliminary indications from EPA and its contractor are that no new information has been discovered which would lead to substantially changing the tone or the conclusions presented in the public review draft, however, any conclusions drawn from the study should be based on the final document.

The risk assessment study will be helpful in determining remediation of sites in the Clark Fork River Operable Unit.

Based on the information in the public review draft, it does not appear the plans for Phase II of the proposed SDLEIP would increase risks to human or ecological sources. It is not clear if the actions proposed will reduce human and ecological risk, but until the Superfund process completes its selection of remedies and ROD, the recommended remediation for the sites in Phase II and other phases of the SDLEIP will not be known.

#### 5.6 Post Remedial Work

Although it appears ARCO would be agreeable to do further remedial work if the ultimate remedy deems it appropriate, the reality of possibly reconfiguring areas of the SDLEIP after initial construction might be highly unpopular with local residents and those who use the park.

#### 6.0 CUMULATIVE EFFECTS:

##### 6.1 Cumulative Effect of Removal vs Treatment in Place vs Doing Nothing

It is still undetermined whether treating tailings in place, or in-situ, costs less and is faster than removing the tailings, properly disposing of the material and filling the area with clean soil. Whether it is or isn't, both are more costly than simply leaving tailings in place. Although the ultimate ROD may be a combination of all three options, the question is raised by some that if a responsible party does a number of small in-situ projects, does this ultimately



equate to a trend that can be defended later as a sanctioned, acceptable remediation process, even though the remedy ultimately indicates different actions for those areas.

Another question is whether these small remediation projects can be credited later as work done by the responsible party as offsets to damaged areas and work accomplished as part of the ultimate remedy.

## 6.2 Individual and Community Participation

The EPA and DEQ realize the importance of positive and cooperative attitudes by landowners and communities in supporting Superfund remediation projects. The agencies also know that attitudes alone cannot determine whether proposed projects should proceed. Scientific and technical work are the foundations for effective remediation, and when joined by individual and community support, leads to the best and most effective relationships.

## 7.0 ALTERNATIVES:

- 7.1 **No Action:** This Subarea 1 would be the only developed subarea. Since Subareas 2 and 3 include DOC land, they would remain unimproved. Subarea 4 is on private land, thus, it could possibly be developed in accordance with the SDLEIP plans.
- 7.2 **Defer Decision:** The DOC would defer its decision on whether to approve the proposed project until the federal Superfund process has been completed at the Clark Fork River Operable Unit.
- 7.3 **Approval:** DOC would approve for its land to be developed in accordance with the plans for Subarea 2. It would also allow the development of DOC land in Subarea 3 when it is feasible. Additionally, the ultimate completion of the SDLEIP would be the development of Subarea 4.
- 7.4 **Approval with modification:**
- 7.4.1 **Modification #1:** Development of the SDLEIP would proceed as described in the previous **Approval** statement (Reference 7.3). Subarea 2 would progress as planned, however, it would be done with the knowledge that upon selection of a remedy or remedies following the RI/FS, EPA and DEQ will determine whether or not the remedies are in accordance with the work done in Subarea



2. If additional work needs to be done, it will be carried out accordingly.

It would also be incumbent on Powell County and the appropriate state agencies to work with the NRDP to insure the work done in the SDLEIP does not jeopardize the state's position in its lawsuit.

7.4.2 **Modification #2:** Development of the SDLEIP would proceed as described in the **Approval** statement (Reference 7.3), except the areas with the highest concentrations of tailings would be identified, removed and properly disposed of, followed by the excavated areas filled with clean soil. This option would increase the initial cost of the proposed development, but would satisfy some present concerns and remove the need to do the replacement later.

7.4.3 **Modification #3:** Development of the SDLEIP would proceed as described in the **Approval** statement (Reference 7.3), but without any disturbance to the tailings, either through removal or in-situ treatment.

7.4.4 **Modification #4:** Development of the SDLEIP would proceed as described in the **Approval** statement (Reference 7.3), except that ARCO would be asked to do more in-situ treatment of deposited tailings.

## 8.0 **PUBLIC INVOLVEMENT:**

In addition to the 30-day review period for the SDLEIP EA, copies of the *South Deer Lodge Entryway Improvement Project - Phase 2 Draft Design Report* are available at the following locations for those who want more details about the development plans for Subarea 2:

- ▶ **Helena** - The Lewis and Clark Library.
- ▶ **Butte** - Butte-Silver Bow Public Library.
- ▶ **Anaconda** - Hearst Free Library.
- ▶ **Deer Lodge** - William K. Kohrs Library.
- ▶ **Missoula** - Missoula Public Library.

...

...

...

...

...

...

...

...

...

...

...

...

...

...



9.0 **RECOMMENDATIONS:**

9.1 Preferred Alternative

*(Note: If DOC chooses to cite a preferred alternative, it may do so. TME)*

9.2 Recommendation for Further Environmental Analysis

IS     More Detailed EA     No Further Analysis

**A Prepared By:**

- ▶ Ron Paige, Montana State Prison Ranch Manager, Department of Corrections.
- ▶ Tom Ellerhoff, Administrative Officer, Department of Environmental Quality.
- ▶ Information Sources:
  - Powell County Planning Office.
  - Atlantic Richfield Company.
  - Titan Environmental Corporation.
  - Department of Fish, Wildlife and Parks.
  - Department of Transportation.
  - Department of Natural Resources and Conservation.
  - State Historic Preservation Office.
  - Natural Resource Damage Program.
  - Environmental Protection Agency.
  - U.S. Army Corps of Engineers.



## ENCLOSURE 1

Four color rendering of the SDLEIP



Subarea 3

Subarea 4



**Enclave Park**

- 10' x 10' x 10' x 10' x 10'
- 10' x 10' x 10' x 10' x 10'
- 10' x 10' x 10' x 10' x 10'
- 10' x 10' x 10' x 10' x 10'
- 10' x 10' x 10' x 10' x 10'
- 10' x 10' x 10' x 10' x 10'
- 10' x 10' x 10' x 10' x 10'
- 10' x 10' x 10' x 10' x 10'
- 10' x 10' x 10' x 10' x 10'
- 10' x 10' x 10' x 10' x 10'

**Westside Park**

- 1. 10' x 10' x 10' x 10' x 10'
- 2. 10' x 10' x 10' x 10' x 10'
- 3. 10' x 10' x 10' x 10' x 10'
- 4. 10' x 10' x 10' x 10' x 10'
- 5. 10' x 10' x 10' x 10' x 10'
- 6. 10' x 10' x 10' x 10' x 10'
- 7. 10' x 10' x 10' x 10' x 10'
- 8. 10' x 10' x 10' x 10' x 10'
- 9. 10' x 10' x 10' x 10' x 10'
- 10. 10' x 10' x 10' x 10' x 10'

**Fishing Access & Raft Launch**

- 10' x 10' x 10' x 10' x 10'
- 10' x 10' x 10' x 10' x 10'
- 10' x 10' x 10' x 10' x 10'
- 10' x 10' x 10' x 10' x 10'
- 10' x 10' x 10' x 10' x 10'

**Legend**

- Trail Loop
- Natural walkway / trail
- Trail signage
- Decorative tree planting
- Common tree planting
- Utility line
- Street Furniture
- Utility Substation

South Deer Lodge Entryway Improvement Project

Subarea 1

Subarea 2



North

Exhibit A  
Masterplan



**ENCLOSURE 2**

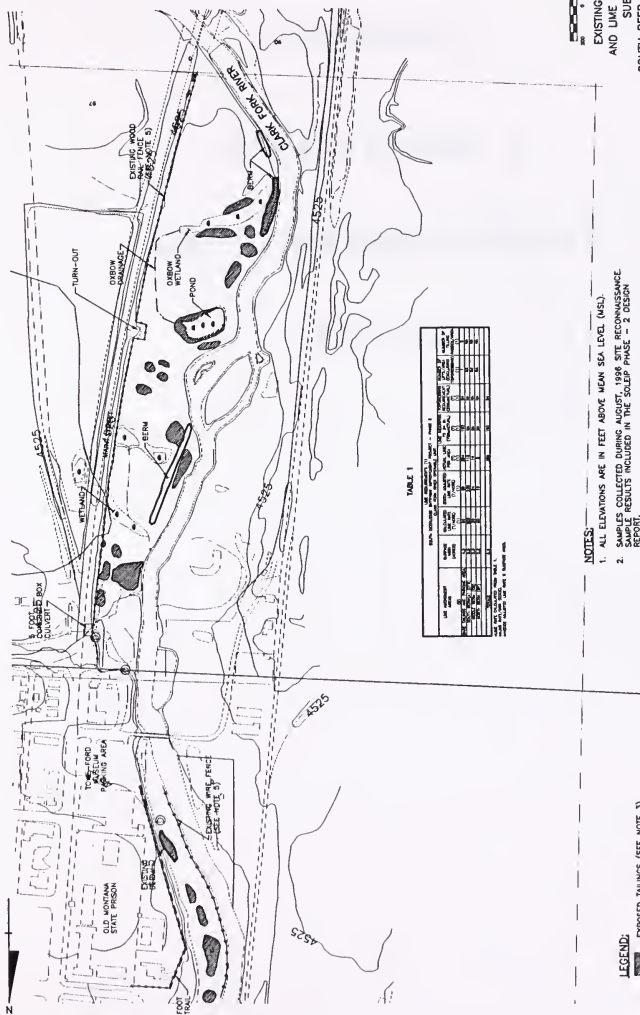
**SDLEIP PHASE 2**

**DRAFT DESIGN REPORT**

**MAP 2-7**







- LEGEND:**
- EXPOSED TALINGS (SEE NOTE 3)
  - WETLAND AREAS
  - DEBRIS LOCATIONS

TABLE 1

DATE	TIME	WIND	TEMP	REL. HUM.	WIND DIR.	WIND S.P.	WIND S.P. (KNOTS)		WIND DIR. (DEG)	WIND S.P. (MPH)	WIND DIR. (DEG)	WIND S.P. (MPH)
							MAX	AVERAGE				
8/1/88	0800	10	75	65	100	10	10	10	100	100	100	100
8/1/88	0900	10	75	65	100	10	10	10	100	100	100	100
8/1/88	1000	10	75	65	100	10	10	10	100	100	100	100
8/1/88	1100	10	75	65	100	10	10	10	100	100	100	100
8/1/88	1200	10	75	65	100	10	10	10	100	100	100	100
8/1/88	1300	10	75	65	100	10	10	10	100	100	100	100
8/1/88	1400	10	75	65	100	10	10	10	100	100	100	100
8/1/88	1500	10	75	65	100	10	10	10	100	100	100	100
8/1/88	1600	10	75	65	100	10	10	10	100	100	100	100
8/1/88	1700	10	75	65	100	10	10	10	100	100	100	100
8/1/88	1800	10	75	65	100	10	10	10	100	100	100	100
8/1/88	1900	10	75	65	100	10	10	10	100	100	100	100
8/1/88	2000	10	75	65	100	10	10	10	100	100	100	100
8/1/88	2100	10	75	65	100	10	10	10	100	100	100	100
8/1/88	2200	10	75	65	100	10	10	10	100	100	100	100
8/1/88	2300	10	75	65	100	10	10	10	100	100	100	100
8/1/88	2400	10	75	65	100	10	10	10	100	100	100	100
8/1/88	2500	10	75	65	100	10	10	10	100	100	100	100
8/1/88	2600	10	75	65	100	10	10	10	100	100	100	100
8/1/88	2700	10	75	65	100	10	10	10	100	100	100	100
8/1/88	2800	10	75	65	100	10	10	10	100	100	100	100
8/1/88	2900	10	75	65	100	10	10	10	100	100	100	100
8/1/88	3000	10	75	65	100	10	10	10	100	100	100	100

- NOTES:**
1. ALL ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL (MSL).
  2. SAMPLES COLLECTED DURING AUGUST, 1988 SITE RECONNAISSANCE REPORT. RESULTS INCLUDED IN THE SOLEP PHASE - 2 DESIGN REPORT.
  3. TALINGS LOCATIONS FROM UNIVERSITY OF MONTANA TALINGS REPAIR AND WETLANDS RESEARCH PROGRAM. ACTUAL LOCATIONS AND SIZES MAY VARY AND WILL BE DELINEATED IN THE FIELD.
  4. LIME APPLICATION RATES DETERMINED BY SCHWABER AND ASSOCIATES.
  5. EXISTING FENCES BETWEEN AREA 2 AND MAIN STREET AND ADJACENT WETLANDS TO BE REMOVED DURING SITE PREPARATION. THE OLD FENCE ARE TO BE REMOVED DURING SITE PREPARATION.

EXISTING CONDITIONS AND LIME REQUIREMENTS SUBAREA 2 SOUTH DEER LODGE COUNTRYWAY IMPROVEMENT PROJECT PREPARED FOR

ARCO ANACONDA, MONTANA

REVISIONS:  
 1. AS NOTED IN FIELD BOOK  
 2. AS NOTED IN FIELD BOOK

NO.	DATE	ISSUE / REVISION	BY	CHK'D BY
1		ISSUED FOR SOLEP DESIGN - PHASE 1		
2		ISSUE # 1 OF 7		
3		ISSUE # 2 OF 7		
4		ISSUE # 3 OF 7		
5		ISSUE # 4 OF 7		
6		ISSUE # 5 OF 7		
7		ISSUE # 6 OF 7		
8		ISSUE # 7 OF 7		



ENCLOSURE 3

***SDLEIP PHASE 2***

***DRAFT DESIGN REPORT***

***MAP 4-7***

1977

1978

1979

1980





**ENCLOSURES 4 through 6**

**University of Montana Soil Maps**















# Reach A Soil Map -- 5 of 9

-  1989 River Channel (Univ. or MT)
-  Historic 100 Year Floodplain
-  Roads
-  Mapping Technique Breaklines
-  **Access** Access Granted by Landowner
-  **No Access** No Access Granted by Landowner
-  Soil Pit Location (Analyzed)
-  Soil Pit Location (Not Analyzed)
-  U. of MT River Mile
-  Historic Sample Locations (CFDMS)

## Tailings Thickness:

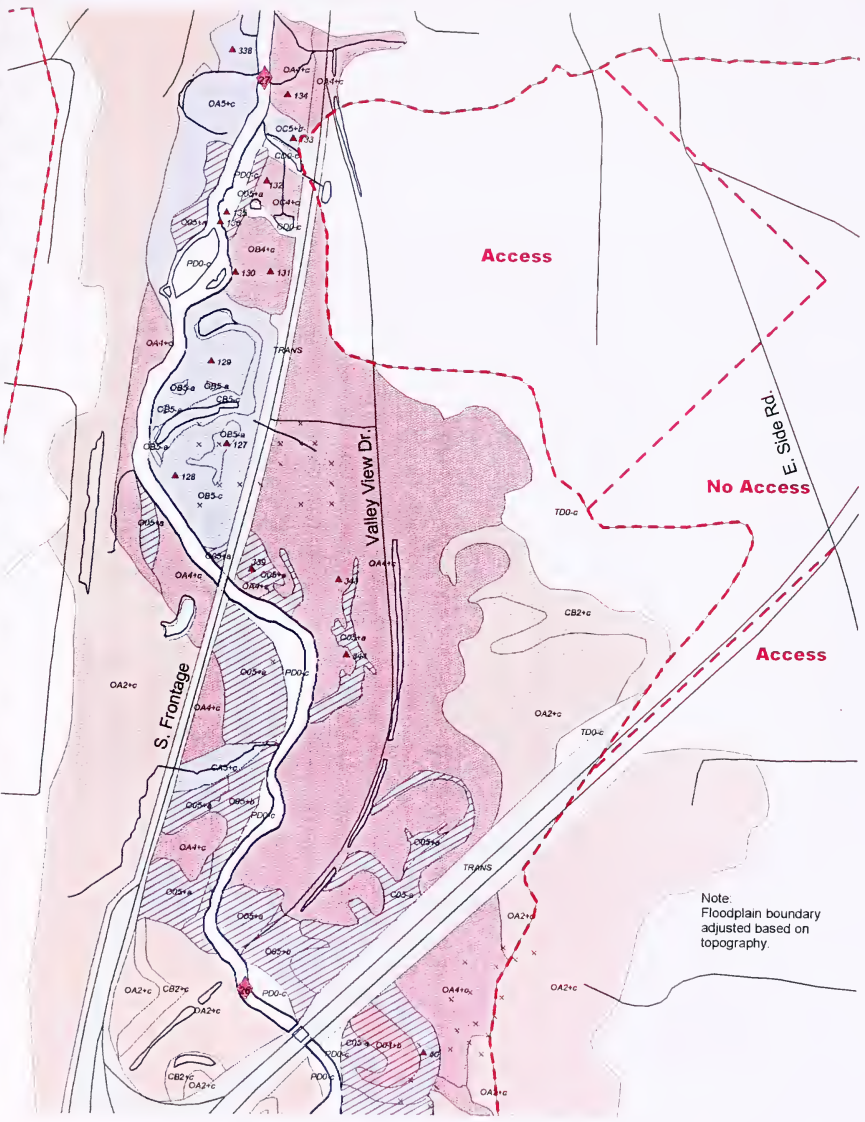
-  No Tailings Present
-  0 to 3 Inches
-  0 to 6 Inches
-  4 to 6 Inches
-  7 to 12 Inches
-  13 to 24 Inches
-  25+ Inches
-  Exposed Tailings
-  Transportation Corridor
-  Open Water

## Soil Unit Explanation

Fluvial Feature:	Cover Soil Thickness:	Tailings Thickness:	Buried Soil:	Vegetation Cover:
O = Overbank	O = Bare Tailings	0 = No Tailings	+ = Present	a = 0-35%
P = Point Bar	A = 1-3 inches	1 = 0-3 Inches	- = Absent	b = 35-70%
C = Channel	B = 3-6 inches	2 = 0-6 Inches		c = 70-100%
T = Terrace	C = 6-12 inches	3 = 4-6 Inches		
W = Wetland	D = >12 inches	4 = 7-12 Inches		
		5 = 13-24 Inches		
		6 = 25+ Inches		







Access

No Access

Access

S. Frontage

Valley View Dr.

S. Side Rd.

Note  
Floodplain boundary  
adjusted based on  
topography.



Note:  
Buried tailings presence  
beneath developed areas  
are inferred from topography.

Main St.

DA2+c

OA4+g

OA4+c

TDD-c

No Access

336

334

333

332

331

330

PDD-g

OG5+e

OC4+g

OC5+c

OB4+c

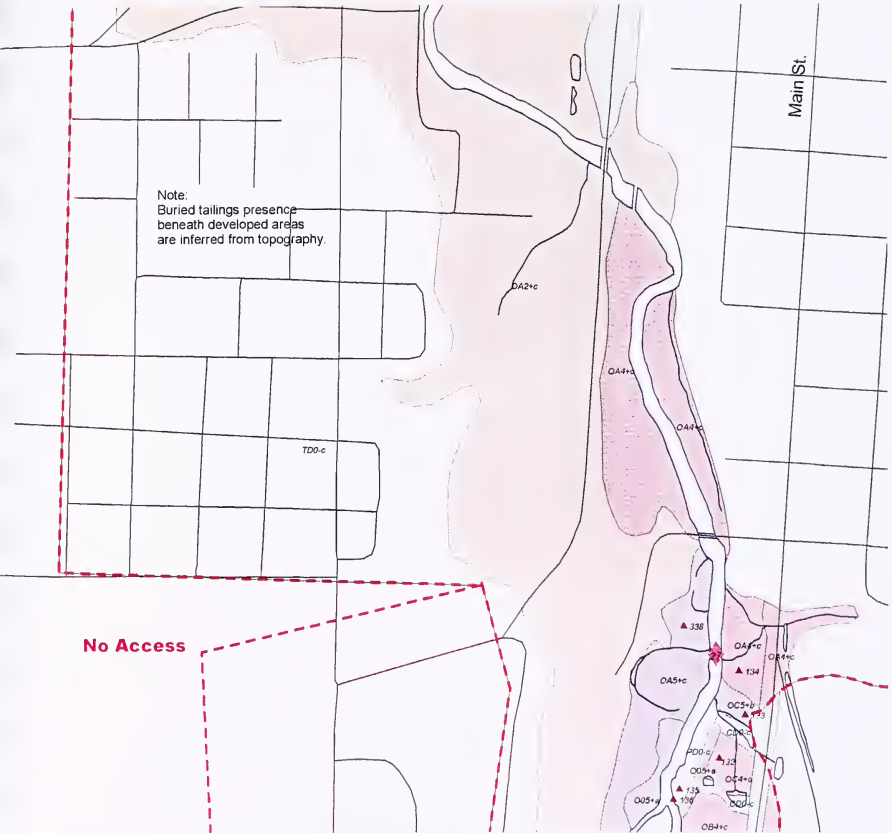
OC5+c

OC5+c

OC5+c

OC5+c

OC5+c





## ENCLOSURE 7

The contents of the seed mixtures:

- ▶ Mixture I
- ▶ Mixture II
- ▶ Mixture III





REVEGETATION MIX I (WETLAND ENHANCEMENT MIX)			
SPECIES	COMMON NAME	COMMON NAME	RATE LBS PLS/ACRE (BROADCAST)
ALOPECURUS ARUNDINACEUS	CREeping FOXTAIL	GARRISON	5.0
BECHMANNIZ SYZYGACHNE	AMERICAN SLOUGHGRASS	EGAN	4.0
ELYMUS CINEREUS	GREAT BASIN WILDRYE	MAGNAR	8.0
GLYCERIA BOREALIS	MANNAGRASS	----	4.0
TOTAL			21.0

<sup>1</sup> BASED ON BROADCAST RATE OF APPROXIMATELY 21 LBS PLS/ACRE. RATES WILL BE HALVED FOR DRILL SEEDING.

REVEGETATION MIX II (WILDFLOWER MIX)		
SPECIES	COMMON NAME	RATE LBS PLS/1500 SQ FT (BROADCAST)
GAILLARDIA ARISTATA	BLANKET FLOWER	(SEE BELOW)
LINUM LEWISII	BLUE FLAX	(SEE BELOW)
RATIBIDA COLUMNARIS	PRAIRIE CONEFLOWER	(SEE BELOW)
SPHAERALCEA COCCINEA	SCARLET GLOBEMALLOW	(SEE BELOW)
RUDEBECKIA HIRTA	BLACKEYED SUSAN	(SEE BELOW)
PENSTEMON EATONII	FIRECRACKER PENSTEMON	(SEE BELOW)
CASTILLEJA CHROMOSA	INDIAN PAINTBRUSH	(SEE BELOW)
ACHILLEA MILEFOLIUM	WHITE YARROW	(SEE BELOW)
ESCHSCHOLTZIA CALIFORNIA	CALIFORNIA POPPY	(SEE BELOW)
LINUM GRANDIFLORUM RUBRUM	SCARLET FLAX	(SEE BELOW)
A COMMERCIALY AVAILABLE FORB MIX CONTAINING 10 NATIVE WILDFLOWER SPECIES		35 LBS PLS/ 1500 SQ FT

REVEGETATION MIX III (UPLAND SEED MIX)			
SPECIES	COMMON NAME	COMMON NAME	RATE LBS PLS/ACRE (BROADCAST)
POA COMPRESSA	CANADA BLUEGRASS	RUEBENS	1.0
PETALOSTEMUM PURPUREUM	PURPLE PRAIRIE CLOVER	----	1.0
AGROPYRON DASYSTACHYUM	THICKSPIKE WHEATGRASS	CRITANA	4.0
AGROPYRON TRACHYCAULUM	SLENDER WHEATGRASS	PRYOR	6.0
ORYZOPSIS HYMENOIDES	INDIAN RICEGRASS	NEZPAR	4.0
PUCCELLIA DISTANS	ALKAJUGRASS	FLUTS	1.5
AGROPYRON INTERMEDIUM	INTERMEDIATE WHEATGRASS	TEGMAR	4.0
TOTAL			21.5

<sup>1</sup> BASED ON A DRILL SEED RATE OF 21.5 PLS PER ACRE. RATES WILL BE DOUBLED FOR BROADCAST SEEDING.

MIX 1 WILL BE USED ALONG THE OUTER EDGES OF THE WETLAND SITES DISTURBED DURING CULVERT AND BRIDGE INSTALLATION.  
MIX 2 WILL BE USED IN HIGH PROFILE AREAS, I.E., AT THE BASE OF THE ENTRANCE SIGN, EITHER SIDE OF TRAILS AND ALONG PARKING AREA.  
MIX 3 WILL BE USED AT MAJORITY OF SITE.

REVEGETATION MIX TABLES  
SUBAREA 2  
SOUTH DEER LODGE ENTRYWAY  
IMPROVEMENT PROJECT

PREPARED FOR

ARCO  
ANACONDA, MONTANA

No.	DATE	ISSUE / REVISION	OWN BY	CK'D BY	AP'D BY	DATE: 2-21-97	FIGURE _	DRAWING NUMBER 5118-A25
						SCALE: N.T.S.		



